D3.5 Probably not

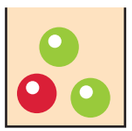
This spread will show you how to:

- Identify different mutually exclusive outcomes and know the sum of the probabilities of all these outcomes is 1
- Understand and use the probability scale

Keywords

Event
Mutually exclusive
Outcome

An **event** is an activity, for example, picking one ball from a box.

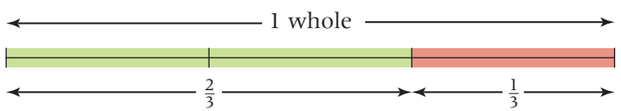


The possible **outcomes** are Green, Green and Red.

Probability of picking a green ball = $\frac{2}{3}$

Probability of picking a red ball = $\frac{1}{3}$

The probabilities of the outcomes add up to 1.



$\frac{2}{3} + \frac{1}{3} = 1$

- **The probabilities of all possible outcomes of an event add up to 1.**

Probability of picking a green ball = $\frac{2}{3}$.

Probability of **not** picking a green ball = $1 - \frac{2}{3} = \frac{1}{3}$.

- **Probability of an outcome not happening = 1 – Probability of the outcome happening**

Example

The probability that Emma does her homework is $\frac{7}{10}$.
Calculate the probability that she does not do her homework.

$1 - \frac{7}{10} = \frac{3}{10}$

Probability she does not do her homework = $\frac{3}{10}$.

These outcomes are **mutually exclusive** because if you get one outcome you cannot get the other one.

- **Mutually exclusive outcomes cannot occur at the same time.**

Example

Which of these outcomes are mutually exclusive?

A	B	C
Spinning a coin: Head, Tail	Pressing a light switch: Light on, light off	Eating breakfast: Cornflakes, muesli

A, **B**.
C is not mutually exclusive as you could choose another type of cereal.

This topic is extended to calculating mutually exclusive outcomes on page 396.

Exercise D3.5

1 A bag contains one blue and four red balls. One ball is taken out.

a Calculate the probability that the ball is blue.
b Calculate the probability that the ball is red.
c Calculate the sum of these answers.

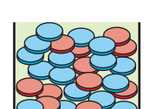
2 A bag contains three blue and seven green balls. One ball is taken out.

a Calculate the probability that the ball is blue.
b Calculate the probability that the ball is green.
c Calculate the sum of these answers.

3 An ordinary dice is rolled.

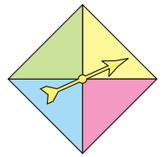
a Calculate the probability of rolling
i a 1 **ii** a 2 **iii** a 3 **iv** a 4 **v** a 5 **vi** a 6.
b Calculate the sum of the answers.

4 A box contains many red and blue counters.
One counter is taken out. The probability that a red counter is taken out is 0.4.
Calculate the probability that a blue counter is taken out.



5 The probability of winning a raffle is 0.1.
Calculate the probability of not winning the raffle.

6 A spinner is made from blue, green, yellow and pink triangles.



a Calculate the probability of spinning blue.
b Calculate the probability of not spinning blue.

7 A drawing pin is dropped. The probability that the pin lands point up is $\frac{4}{5}$.
What is the probability that the pin does not land point up?

8 The probability of rain at Styhead Tarn in the Lake District is $\frac{7}{10}$.
Calculate the probability of it not raining at Styhead Tarn.

9 The letters of the word EQUILATERAL are put in a bag. One letter is taken out.
a Calculate the probability of choosing an E.
b Calculate the probability of not choosing an E.